Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.Tech (CHE)/SEM-2/CH-11-IV (I)/2010

2010

PETROCHEMICAL TECHNOLOGY

Time Allotted : 3 Hours Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* questions. 5 × 14 = 70

1. a) Explain the problem of using strong basic solution for sweetening of natural gas & how it can be overcome ? Briefly discuss about the Merox Process on natural gas sweetening. 2 + 6

   b) What kind of naphthenes & aromatic compounds are present in crude oil and how are they recovered industrially ? Discuss about the technological aspect of sulfur compound removal from crude oil. 4 + 2

2. a) Give an operational overview of steam reforming process of naphtha for synthesis gas production highlighting two important unit processes of 'shift conversion' & 'methanation'. 6

   b) Critically discuss about the temperature sensitivity and catalyst selectivity of 'oxosynthesis' operation. How is propionaldehyde manufactured industrially ? 3 + 5

3. a) What chemical modification makes the synthetic detergent biodegradable ? Mention the role of different ingredients other than surfactant taken in finishing process of synthetic detergent. 2 + 4

   b) What are the process intensification technologies being introduced rapidly in modern petrochemical industries ? How these technologies have been analysed and implemented ? Give an overview of Micro-channel Reactors. 2 + 2 + 4

4. a) Explain the merits and demerits of Orthoflow catalytic cracking unit and stacked catalytic cracking unit.

   b) Explain the concept of 'Chemical Refinery'. 10 + 4

5. Draw the net process flow-sheet of Naphtha cracking unit and discuss about the parameters which influence the process drastically. 14

6. a) What does it mean by 'Breathing losses' ? Explain the concept of crank case dilution.

   b) How many techniques you may suggest to minimize the catalysts deactivation ? 8 + 6

7. Write short notes on any *four* of the following : $4 \times 3\frac{1}{2}$

a) Fisher Tropsch Synthesis

b) Natural Gas Liquids

c) Reactive distillation

d) Catalyst Morphology and Activity

e) Diesel Additives

f) ASTM Distillation Characteristics.